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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,453	01/12/2004	Stephen R. Dunne	108232	1062
23490	7590	03/13/2006	EXAMINER	
JOHN G TOLOMEI, PATENT DEPARTMENT UOP LLC 25 EAST ALGONQUIN ROAD P O BOX 5017 DES PLAINES, IL 60017-5017			HOPKINS, ROBERT A	
			ART UNIT	PAPER NUMBER
			1724	
DATE MAILED: 03/13/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/755,453

Applicant(s)

DUNNE ET AL.

Examiner

Robert A. Hopkins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28-42 is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1-12-04, 6-24-05</u> | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Drawings*

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the regeneration, adsorption, and cooling zones having a number greater than 1 must be shown or the features canceled from claim 23. Also, the limitations of claim 5 must be shown or claim 5 must be cancelled. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

Claims 1-21,23-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 line 4 recites "through which compressed gas ...". There is a lack of antecedent basis for "compressed gas" in previous claim limitations. Line 2 of the claim merely recites "providing a gas feed". There is no step specifically reciting compression of the gas feed. Correction is requested. Claims 2-21 depend on claim 1 and hence are also rejected. Examiner also notes that upon correction of claim 1, claim 6 should be cancelled because the subject matter would not be further limiting of claim 1.

Claim 23 recites "wherein P is an integer from 0 to 5 and wherein P is greater than 0. Examiner notes that if  $P=0$ , then a claimed cooling zone does not exist. Examiner also notes that P cannot be a fraction between 0 and 5, such as  $\frac{1}{2}$ . Therefore, examiner suggests changing the range to -- 1 to 5 --, and deleting "and wherein when P is greater than 0". Correction is requested. Claims 24-26 depend on claim 23 and hence are also rejected.

Claim 23 recites "M-1 steps sending the effluent from regeneration zone H, where H is an integer and decrements from M to 2 with each step, into regeneration zone H-1 to remove at least one impurity from said regeneration zone". Examiner is unclear as to what is meant by "M-1 steps"? Examiner also notes that with the step

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"where H is an integer and decrements from M to 2 with each step" and if M is an integer from 2 to 10 as designated in an earlier part of the claim, then the decrement is from 2 to 2, which is not a decrement at all.

Claim 23 recites "N-1 step(s) sending the effluent from adsorption zone K, where K is an integer and decrements from N to 2 with each step, into adsorption zone K-1 to remove at least one impurity on the adsorber". Examiner is unclear as to what is meant by "N-1 step(s)"? Examiner also notes that with the step "where K is an integer and decrements from N to 2 with each step" and if N is an integer from 2 to 10 as designated in an earlier part of the claim, then the decrement is from 2 to 2, which is not a decrement at all.

Claim 23 recites "wherein if P is greater than 0, ..." . Examiner notes that, as designated in part a of claim 23, P is always greater than 0, therefore the statement in part g is indefinite and confusing.. Also , part g recites "and wherein if P is 0, ...". Examiner notes that, as designated in part a of claim 23, P is never 0 and always greater than 0, therefore the statement in part g is indefinite and confusing.

Claim 23 part h recites "P-1 steps sending the effluent from cooling zone L, where L is an integer to cool the adsorber and producing an effluent stream with greater enthalpy and if P is 1, skipping this step h). Examiner is unclear as to what is meant by "P-1 steps". Examiner is also unclear as to the limitation "skipping this step h"? If step h is skipped, what happens next in the process?

Examiner notes that the overall structure of claim 23 is confusing. Examiner suggests providing a drawing clearly illustrating multiple zones, and also including a

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chart in the specification which clearly details a progression of each integer in the claim denoting where each regeneration, adsorption, and cooling zone is located during a cycle of the process. For example, if there are 5 regeneration zones, 5 adsorption zones, and 5 cooling zones, a sample chart should be included to show what function each of the 15 zones is performing during a single cycle.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,2,6,7,14,15,17,18,21 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ohman(5642629).

Ohman teaches a process for producing a purified compressed gas comprising providing a gas feed(8), providing at least one rotary adsorber(7) having a multiplicity of passages through which compressed gas(from compressor 1) can flow for adsorbing impurities therefrom, the rotary adsorber capable of adsorption of impurities from the compressed gases and of regeneration on a continuous basis as the wheel rotates, after the gas feed has been compressed to produce a compressed gas feed, sending the compressed gas feed through a regeneration sector(A; column 3 lines 49-51) of the rotary adsorber wherein the compressed gas feed removes impurities from the regeneration sector of the rotary adsorber and produces a contaminated stream of compressed gas containing the impurities, then cooling the contaminated stream of

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compressed gas(heat exchanger 3) and condensing condensable impurities from the contaminated stream of compressed gas with a condensing means(3), removing a quantity of condensed impurities(6) from the condensing means and thereby producing a cooled stream of compressed gas, then passing the cooled stream of compressed gas to an adsorption sector(B; column 3 lines 55-58) of the rotary adsorber wherein a further quantity of impurities are removed from the compressed gas to produce a purified compressed gas product. Ohman further teaches wherein the purified gas product is cooled(heat exchangers 4 and 5) to a desired temperature to produce a cooled purified compressed gas product. Ohman further teaches wherein a minor portion of the cooled purified gas product, having been cooled to a desired temperature(heat exchanger 4), is sent to a cooling sector( c ) of the rotary adsorber to cool the cooling sector. Ohman further teaches wherein the gas is air. Ohman further teaches wherein the impurity is water. Ohman further teaches wherein the compressed gas feed travels in a direction in the rotary adsorber counter-current to the cooled stream of compressed gas. Ohman further teaches wherein the portion of the purified compressed gas product travels co-current to the compressed gas feed in the rotary adsorber. Ohman further teaches wherein the purified compressed gas product comprises between 10 and 250 parts per million water.

Claim 27 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ohman(5642629).

Ohman teaches an adsorbent wheel system comprising at least one adsorbent sector(B), at least one regeneration sector(A), and at least one cooling sector(C),

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wherein said adsorbent wheel system comprises an adsorbent wheel, the adsorbent wheel comprising two flat sides, parallel to a diameter of the adsorbent wheel and a continuous round edge parallel to an axis of rotation of the adsorbent wheel. Examiner notes the flow progression of an airflow through the adsorbent wheel is not given patentable weight for an apparatus claim.

Claim 27 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Dunne(5512083).

Dunne teaches an adsorbent wheel system comprising at least one adsorbent sector(32), at least one regeneration sector(34), and at least one cooling sector(33), wherein said adsorbent wheel system comprises an adsorbent wheel, the adsorbent wheel comprising two flat sides, parallel to a diameter of the adsorbent wheel and a continuous round edge parallel to an axis of rotation of the adsorbent wheel. Examiner notes the flow progression of an airflow through the adsorbent wheel is not given patentable weight for an apparatus claim.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohman(5642629).



Ohman teaches all of the limitations of claims 3 and 4 but is silent as to "wherein said compressed gas feed is heated by auxiliary heating means" and "wherein said compressed gas feed is heated by natural heating means". Examiner notes that the compressor naturally raises the temperature of the gas feed, however if the compressed gas feed is not at a temperature which is optimal for regeneration of the adsorbed substances on the regeneration sector of the rotary adsorber(7), examiner respectfully submits that it would have been obvious to someone of ordinary skill in the art to provide a auxiliary heating mechanism of a known type(electric heater, natural heating, etc) to increase the temperature to the well known temperature required for optimal desorption of the substances on the regeneration sector of the rotary adsorber.

***Allowable Subject Matter***

Claims 8-13,19,20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 8 recites " wherein a minor portion of said cooled purified compressed gas product, having been cooled to a desired temperature, is sent to a cooling sector of the rotary adsorber to cool said cooling sector". Ohman teaches an entirety of the gas flow passing through a section C of the rotary adsorber before passing through a heat exchanger(5) and expander(2). It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a step of wherein a minor portion of said cooled purified compressed gas product, having been cooled to a desired temperature, is sent to a cooling sector of the rotary adsorber to cool said cooling sector

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because such a modification to Ohman would teach against sending an entirety of the has flow through section C of the rotary adsorber. Claims 9-13, 19, and 20 depend on claim 8 and hence would also be allowable upon incorporation of claim 8 into claim 1.

Claims 22, 28-42 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 22 recites "removing from said cooled purified compressed gas product a minor portion of cooled purified compressed gas, wherein said minor portion is sent to a cooling sector of said rotary adsorber to cool said cooling sector". Ohman teaches an entirety of the gas flow passing through a section C of the rotary adsorber before passing through a heat exchanger(5) and expander(2). It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a step removing from said cooled purified compressed gas product a minor portion of cooled purified compressed gas, wherein said minor portion is sent to a cooling sector of said rotary adsorber to cool said cooling sector because such a modification to Ohman would teach against sending an entirety of the has flow through section C of the rotary adsorber.

Claim 28 recites " a process of producing purified compressed gases in a tow rotary contactor system wherein said two rotary contactor system comprises a first rotary adsorber and a second rotary adsorber, ...". Ohman teaches a single rotary adsorber. Maekawa et al(5167679) discloses a two rotary contactor system, however Maekawa et al only teaches an adsorption sector and regeneration sector for each

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adsorber, and the claim does not teach the process steps in the body of claim 28. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a process of producing purified compressed gases in a tow rotary contactor system wherein said two rotary contactor system comprises a first rotary adsorber and a second rotary adsorber because neither Ohman nor Maekawa et al suggest such a modification. Claims 29-39 depend on claim 28 and hence are also allowed.

Claim 40 recites " a two-stage dryer for producing a low moisture gas stream comprising: at least two rotary contactors, and each of said rotary contactors comprising at least one adsorbent, regeneration, and cooling sector; ...". Ohman teaches a single rotary adsorber. Maekawa et al(5167679) discloses a two rotary contactor system, however Maekawa et al only teaches an adsorption sector and regeneration sector for each adsorber, does not teach a condensing means, and also does not teach limitations f) and g) of claim 40. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a two-stage dryer for producing a low moisture gas stream comprising: at least two rotary contactors, and each of said rotary contactors comprising at least one adsorbent, regeneration, and cooling sector because neither Ohman nor Maekawa et al suggest such a modification. Claims 41 and 42 depend on claim 40 and hence are also allowed.

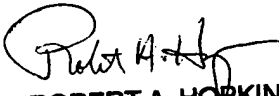
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert A. Hopkins whose telephone number is 571-272-1159. The examiner can normally be reached on Monday-Friday, 7am-4pm, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rah  
March 8, 2006

  
ROBERT A. HOPKINS  
PRIMARY EXAMINER  
*P.U. 1724*